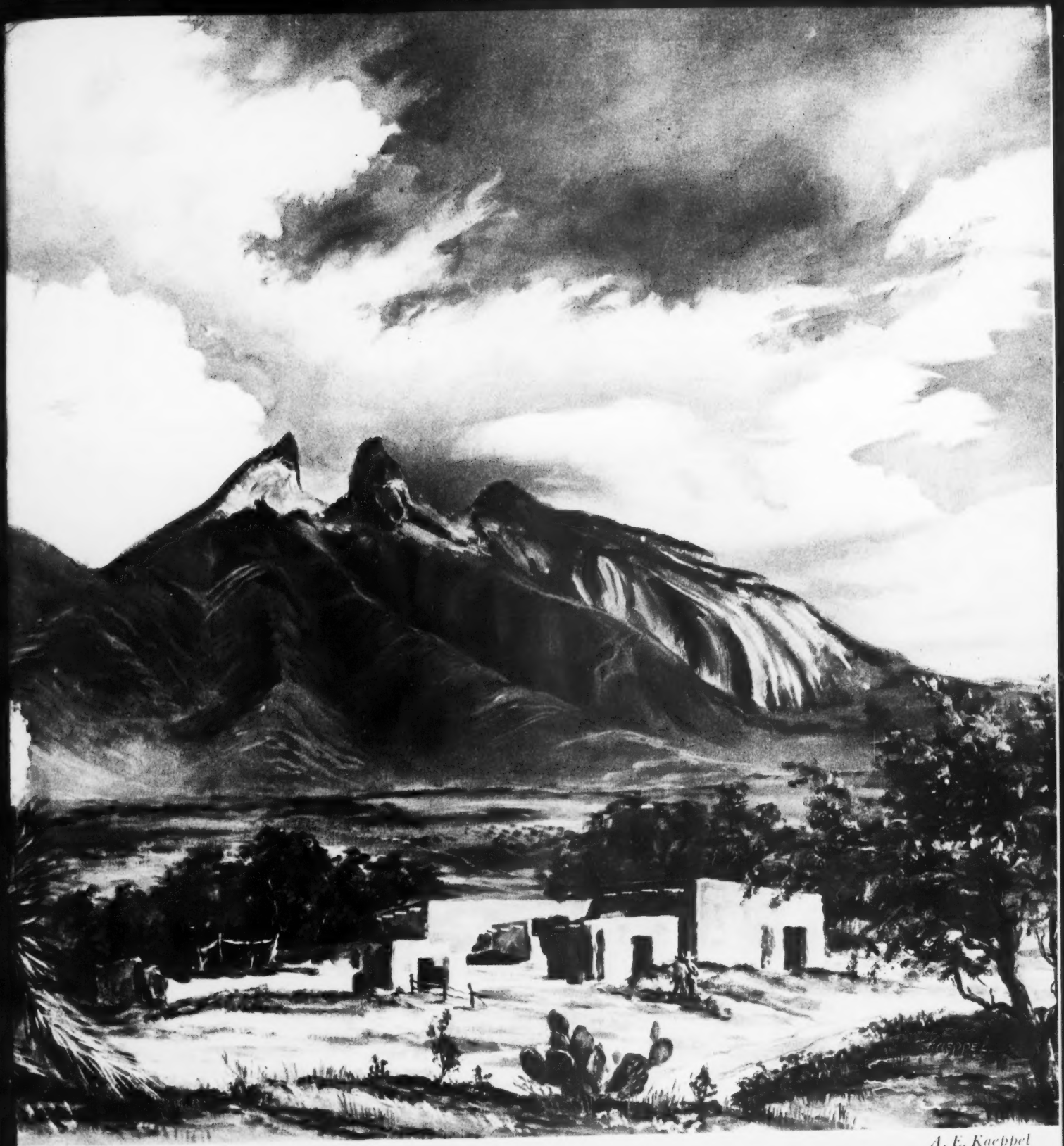
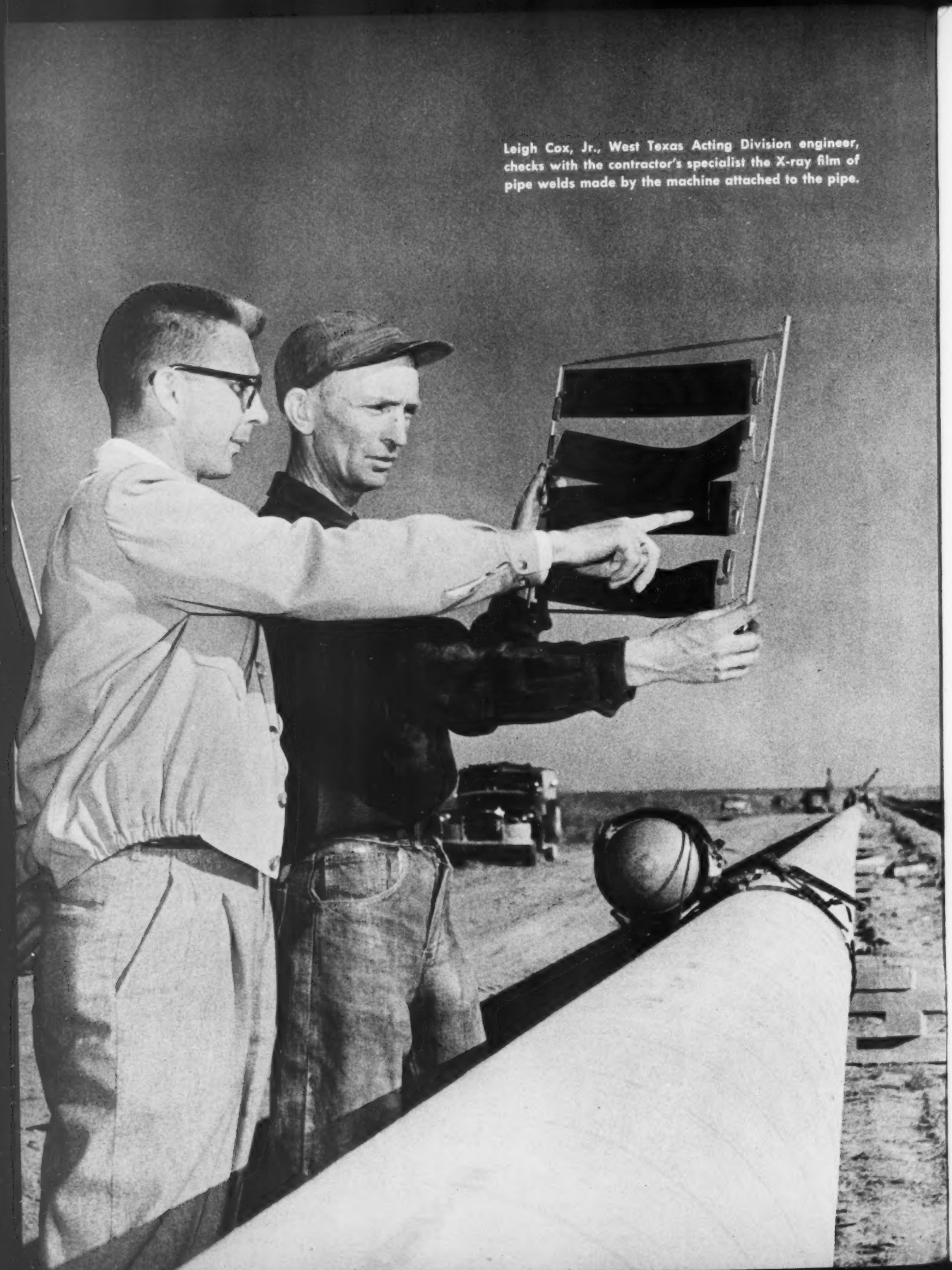


Saddle Mountain

A. E. Kaeppel

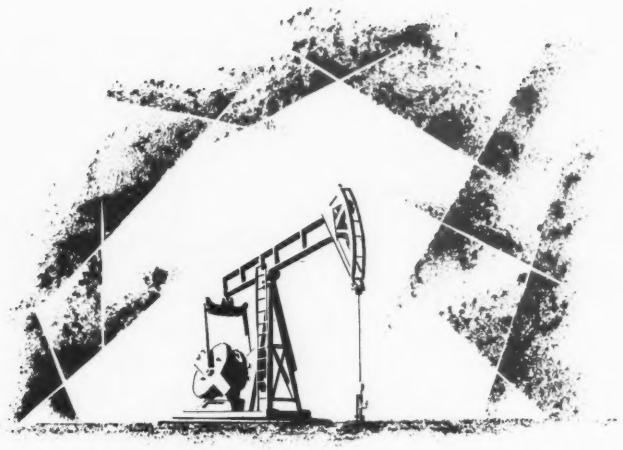
The Humble Way

JANUARY-FEBRUARY, 1957



Leigh Cox, Jr., West Texas Acting Division engineer, checks with the contractor's specialist the X-ray film of pipe welds made by the machine attached to the pipe.

The Humble Way
January-February, 1957
Vol. XII No. 5



WE ARE NOT RUNNING OUT OF OIL

By RICHARD J. GONZALEZ

Director and Treasurer

ABUNDANT supplies of energy—particularly oil and gas—for industry, agriculture, transportation, and the home are vital to our economic progress and national security. Mineral energy consumed in the United States is now equivalent to 50 servants per capita, or nearly twice as many as in the depression year of 1932.

Petroleum supplies two-thirds of the energy consumed in the United States. We are currently using about 135 billion gallons of petroleum products a year and 10 trillion cubic feet of gas. For a population of 165 million, this means over 1,200 gallons a year, or more than three gallons daily per person. Per capita consumption is expected to double in the next 15 to 20 years!

Fortunately for our standard of living and for our national security, practically all of the natural gas and more than 85 per cent of the oil we use is produced in this country. This means that we must discover and develop annually about three billion barrels of crude oil and natural gas liquids, plus about 10 trillion cubic feet of natural gas *just to replace petroleum as fast as we are using it*. Even larger quantities are needed to keep pace with increasing requirements in the future.

This prospect has led to some predictions that we will soon start running out of oil in the United States. Some say that we must plan to use more foreign oil. Others contend that we will soon find it advantageous to make oil from shale. Still others predict that coal will enjoy a great increase in demand when supplies of oil and gas can no longer keep pace with increased requirements.

The belief that we are running out of oil is not new. It has come up many times in the past. Each time, however, subsequent discovery and development have disproved the pessimistic prophecies. Still, there are always those who believe that the more oil we have found the closer we come to the evil day when the last barrel of oil will be found.

Such a view is tenable only if we believe that the amount of oil remaining to be found is small in relation to future requirements. Its validity may be questioned for two reasons: (1) each experience in finding oil provides new clues as to where to look for more new oil, and (2) the large sedimentary areas that still remain to be explored intensively should be the source of important future discoveries.

Fortunately, we do not appear to be near the time when the U. S. has to

worry about running out of oil. The rate at which new oil is being developed in the United States has increased steadily to date and the current levels of operations will mean an increase in the rate of discovery for the foreseeable future.

Cumulative discoveries of crude oil in the United States through 1955 exceeded 82 billion barrels. According to records of production and official estimates of reserves made at the time, the new oil discovered was 13.2 billion barrels in the sixty-six year period 1859-1925, and then for the next three decades 17.4 billion barrels, 20.8 billion barrels, and 30.9 billion barrels, respectively. Nothing in this record suggests any slowing down in the rate of discovery. In terms of results per well drilled, only a slight downward trend is evident over the past thirty years, and this trend may be checked or reversed for the next ten years by the high results per well expected from offshore drilling.

For the past twenty years the development of new oil has kept pace with the completion of oil wells. In 1956, about 59,000 total wells and 32,000 oil wells were completed in the United States. On the basis of experience in the period 1936-1955, this rate of drilling maintained over a decade should develop more than 40 billion barrels of new oil. Since drilling responds to the volume and value of production, it will be surprising indeed if drilling and development of new oil over the ten years 1956-1965 do not exceed the rate in 1955. The minimum expectancy for new oil over the next decade represents a continuation of the past upward trend of discovery in proportion to the rate of exploration and drilling.

There is no way for anyone to know how much oil will be found in the United States. The answer will depend on economic variables and national policy as well as on the unknown quantity of oil existing beneath the surface of the earth. The United States Geological Survey concluded in 1951 that the time has not yet arrived when a definite accurate estimate of ultimate production can be made. Its views on the prospects for future domestic supplies were expressed as follows:

> "If the future can be judged by the past, oil and gas will be found in sufficient quantities for many years to come. In the United States adequate production has been a direct function of economic incentive. Until the unpredictable date at which that incentive fails to provide the needed supplies, there will be no convincing evidence that we have reached the limits of our ability to expand the potential ultimately recoverable reserves of petroleum."

Recently, some estimates that the United States will produce ultimately only 150-200 billion barrels of oil have attracted widespread attention because they indicate that the United States will reach its maximum production in ten or twenty years and be running out of oil before long. Much less attention has been given to an estimate by the Department of Interior which is 50-100 per cent higher:

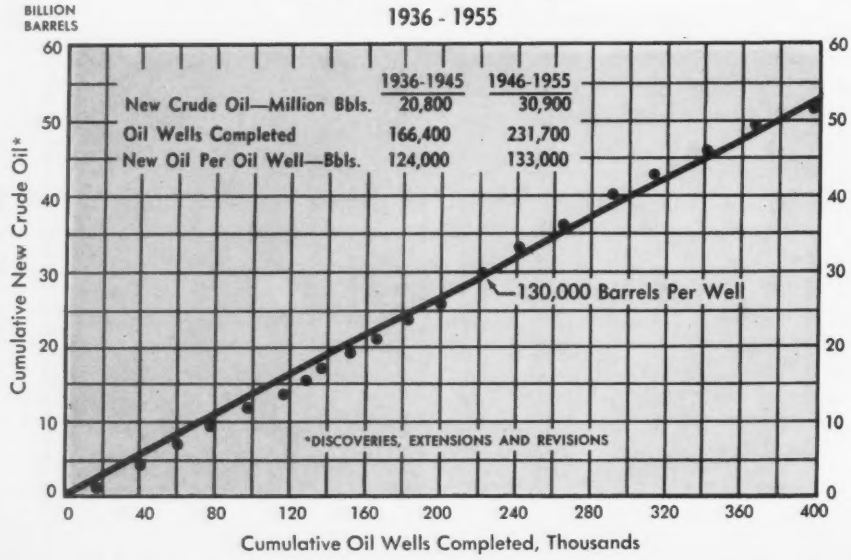
> "Considering that trends in production and discovery are still headed upward, and that significant improvements in recoverability are now being accomplished or promised in the future, a total of 300 billion barrels as the ultimate reserves of the United States and of the adjoining Continental Shelves seem to be a reasonable figure."

Predictions of ultimate discovery are apt to prove conservative for several reasons. Many of these predictions appear to be based on the idea that there remains to be discovered only as much oil as has been found in the past. Under such assumption, it will always be true that the predicted production curve will show a decline in output within a foreseeable period of time. Based on past experience, there is serious question of the validity of such assumption. In 1941, the most optimistic estimate of ultimate production was 100 billion barrels, or slightly more than twice the estimate of the recoverable reserves that had been discovered up to that time. The estimate of cumulative discoveries had already passed 82 billion barrels by 1955 with the likelihood that the figure of 100 billion barrels may be exceeded by 1960. In less than twenty years there will have been discovered all the remaining oil expected by the most optimistic estimate of 1941. With the undisputed evidence of larger discoveries, the latest estimates of ultimate production have already been raised substantially. In another fifteen or twenty years, as discovery continues to confound the predictions that we are running out of oil, estimates of ultimate domestic production may well exceed even the most optimistic recent estimate of 300 billion barrels.

Even scientific estimates of ultimate oil production, based on the application of a factor for reserves to be discovered per square mile of sedimentary area and a factor as to the proportion

CUMULATIVE NEW CRUDE OIL* HAS KEPT PACE WITH OIL WELL COMPLETIONS

1936 - 1955



DEVELOPMENT OF NEW OIL PER WELL HAS REMAINED RELATIVELY CONSTANT IN PERIOD 1926-55

New Oil—Billion Bbls.	13.2	17.4	20.8	30.9
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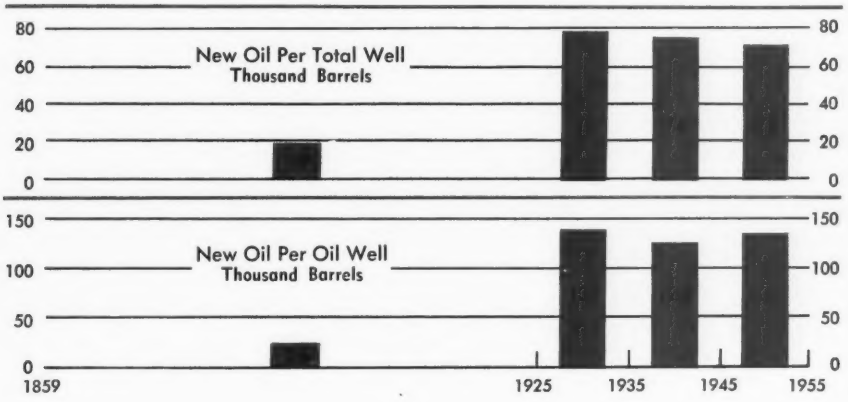


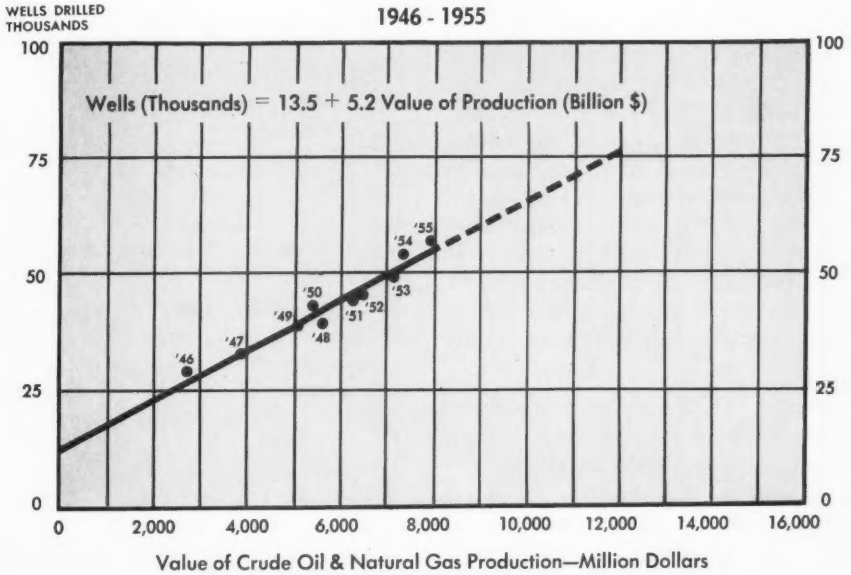
of the discovered oil that will be recovered by production, have proved conservative in the past because both of these factors change upward with time as a result of additional discoveries and improved techniques.

The discovery of more oil provides a basis for more confidence as to what may be produced from the total sedimentary area, only part of which has been explored and developed. It is interesting to note that one of the most intensively drilled areas in the world, the North Texas area of 33,470 square miles, is still the scene of active drilling and increasing production although more than 4 wells per square mile have been drilled in the area. The active search for oil in recent years leaves no question that the industry expects to find substantial additional quantities of oil in both old and new producing provinces. As more oil is found in old and new provinces (such as the Continental Shelf, the Williston Basin, and the Four Corners of Arizona, Colorado, New Mexico, and Utah), more information will become available as a guide to the effective search for still more deposits.

Changing technology is another factor that makes it difficult to predict now what ultimate production will be. Scientific estimates of ultimate production appear to be based on recovering only about 40 per cent of the oil in place, reflecting past experience and current practices. Estimates that ultimate production will be 200-300 billion barrels of oil really indicate discovery of reservoirs with 500-700 billion barrels of oil in place. Clearly, a modest increase in the percentage of oil in place recovered will add materially to ultimate production. Unitization and pressure maintenance projects and other significant new developments may mean much higher rates of recovery in the future than in the past. They will have a favorable influence in future years on estimates of proved reserves and ultimate production.

Past discoveries and production have served to increase reserves and estimates of ultimate production rather than to exhaust reserves. Additional discoveries have meant increased production, and this, in turn, has provided the incentive and financial resources for a greater search for oil. New oil from discoveries, extensions, and revisions has rather consistently been equal to about 1.5 times production. This relation means that over a period of years proved reserves increase by about half a barrel for every barrel produced, paradoxical as that may seem. While the discovery of oil may theoretically limit the possibility of future discoveries from deposits of unknown size, in actual practice it provides information that enables the industry to find oil that might not otherwise be discovered. Until such time as there is clear evidence that the domestic industry cannot find more than a barrel of new oil for every barrel produced, there is no reason to believe predictions that we will soon be running out of oil. As more oil is discovered, the estimate of ultimate production in the United States will continue to be pushed upward and the predicted date of running out of oil will be pushed farther into the future.

DRILLING DEPENDS ON THE VALUE OF OIL & GAS PRODUCTION IN THE UNITED STATES
1946 - 1955



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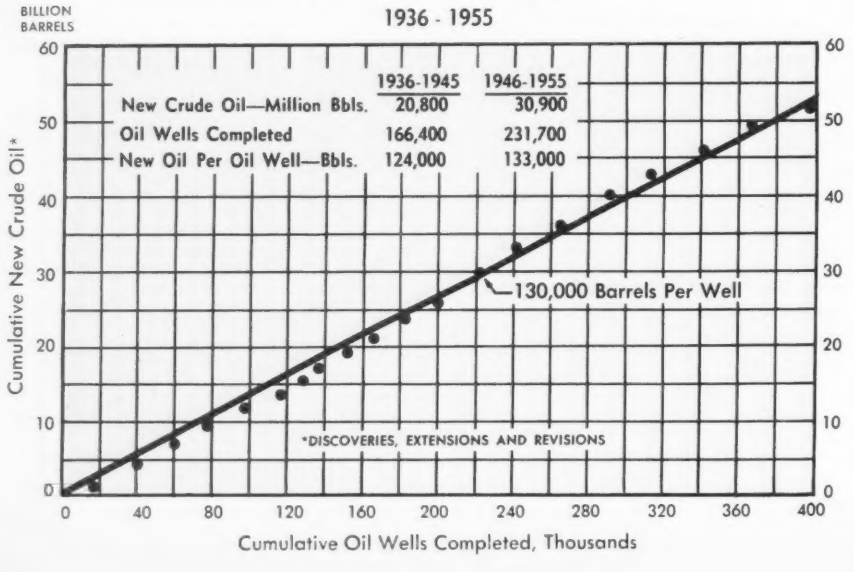

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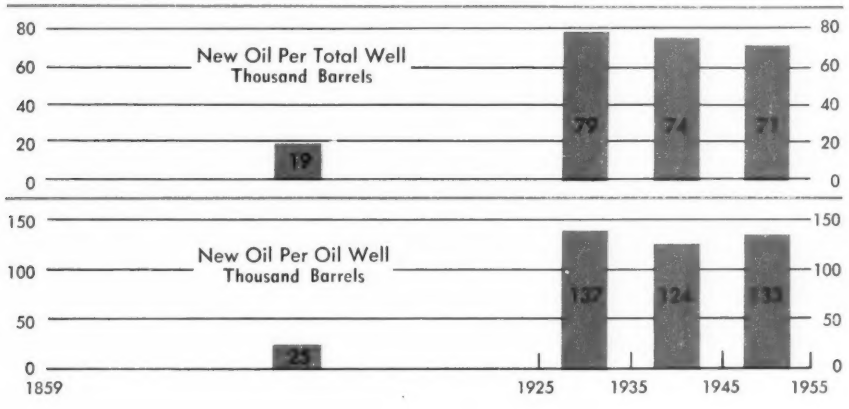

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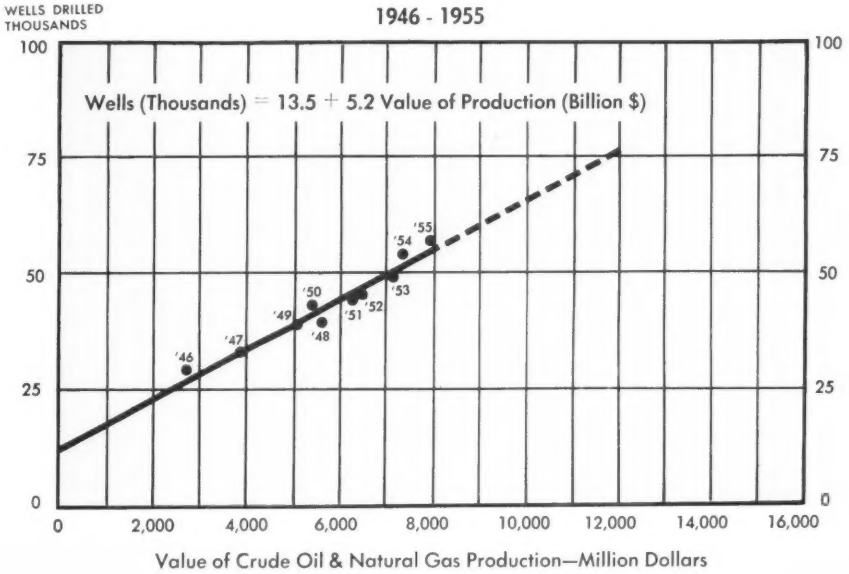


Contour lines of subsurface geological map indicate to Humble geologist the presence of likely oil-bearing structures below the surface of the earth.

Mapping for Oil

Via wavy contour lines, Humble geologists, geophysicists guide the way to new petroleum reserves

NOT long ago an elderly man dressed in khakis strode purposefully into the Humble Building in Houston with a long, rolled document clutched tightly under one arm. In his eye was the gleam of a man on a mission.

He owned a quarter-section of good Texas land, he carefully explained to a Humble geologist, and he felt sure there was oil on his place. Smoothing out a home-made map, the man enthusiastically pointed out the exact spot—marked by the traditional X—where the well should be drilled. It was bound to be a gusher and he wanted to sell the map and lease the land to Humble as a sure-fire investment.

Never one to pass up a possibility, however small, the geologist listened courteously and with interest. A few minutes later, however, he was as disappointed as the landowner when a check revealed that the quarter-section lay right in the middle of one of the few Texas counties still on the "dry" side of the oil ledger. To discourage them still further, it developed that exploration in that area some years ago had found little of interest.

Although the geologist turned down this particular map—and many other similar "oil field maps" that have flowed into the Humble Building through the years—it doesn't mean that the Company is not a great believer in the value of maps in finding oil. For, year after year, Company employees make and maintain thousands of maps for just that purpose. But unlike the farmer's chart, they are not prepared on hunch or based on intuition. Rather, they are scientific documents put together at considerable effort and expense, based on data collected by geologists, geophysicists, gravity meter and seismograph crews, magnetometer operators, scouts, landmen, and a host of other specialists.

Maps are, in fact, one of the great tools used by the petroleum industry today in its oil-finding efforts.

As a Humble geologist said recently: "Maps tell us where we are in the oil business and in what direction we are moving. We couldn't operate without them."

It takes many types of maps to help a company like Humble keep pace in its day-to-day job of finding new oil reserves. There are thousands of maps of several different kinds such as surface geological, photogeological, subsurface geological, gravity, magnetic, and seismic maps—made and maintained each year for this purpose. Each document is unique, assembled from different types of information, although all are tied together by a single, common bond—oil. All are designed to tell the same story—the location of likely oil-bearing structures below the surface of the earth.

The job of making these oil-finding guideposts falls principally to two types of Humble employees—geologists and

Trail-blazing Humble geologists pause on the brink of Arizona canyon for elevation reading of fault. Their data will be used in making surface geological map of area.

geophysicists. They are the real mappers of the oil industry. To these men is given the original and exacting job of accumulating information in the field and translating it as contour lines. From the resulting scientific charts are answered the very basic questions: What acreage should Humble lease? Where should Humble's wildcat and field wells be drilled?

Although there are many types of information used in Humble's search for petroleum, geologists and geophysicists consider that all the maps of any particular area fit together into one big picture. Take a case in point—Humble's mapping program of one section of the Arizona Four Corners area.

When the Company first moved into Northeastern Arizona a number of years ago in the search for oil and gas, Humble's surface geologists first walked the land, chipping away at outcrops, examining the rocks, running elevations and penciling in their findings on a preliminary chart. From their data, a surface geological map was carefully put together and with its contour lines came the first clue of a potential oil-bearing structure in the area.

To further define the anomaly, a Humble gravity meter crew moved in with their delicate recording equipment; and a gravity map, drawn up from their data by a geophysicist, confirmed the structure. Next a Humble subsurface geologist began accumulating available subsurface geological information—electric well logs, cuttings and core test reports. From the resulting subsurface geological map, it was proved that the rock type—facies—of a known producing formation extended into the area in question. With this mass of information, leases were taken in the area.

Thus, one single area was mapped three different ways, yet all the maps when fitted together indicated basically the same story—the location of a subsurface structure that might contain oil.

To correlate the big picture and determine exactly where to drill on the new leases, a Humble geologist sat down for careful study of the three maps. From each he gleaned bits of information that might give clues to the size and shape of the structure he was seeking. A report then was made to Humble's Division geologist along with a recommendation to drill. He, in turn, forwarded the report to Humble's chief geologist in Houston, who authorized the wildcat. The location was turned over to Humble's Production Department, the site staked by civil engineers, and the well was spudded. And six weeks later, Humble's first venture in Arizona was brought in as a producer.

In this particular case, the entire mapping program continued over a period of six or seven years before the discovery well was drilled. In other cases, the mapping of an area may take place in a relatively short period of time—less than one year from commencement of mapping until a well is drilled. In still other instances the mapping of an area may continue for nearly 20 years before a discovery is made. Humble's exploration activities which helped find the Neches Field were like that.

Background on the Neches discovery dates to 1934, when Humble surface geologists mapped a possible high east of the nearby Boggy Creek Field —a little more than a mile away. But the surface information wasn't sufficiently conclusive to justify drilling a well at that time. Other companies also became interested in the same general area and drilled several wells. Each resulted in a dry hole, but infor-

Seismic explosions help mappers pinpoint structures once an anomaly has been spotted. Shock wave reflection patterns are translated into contour lines on seismic map by geophysicist.

Gravity meter crews like this one in West Texas cover wide areas in their quest for gravity information on subsurface structures. Data eventually is computed by geophysicist, transferred to gravity map.

mation from the well logs of these tests when integrated with the surface control further strengthened the possibility of a favorable structure east of the old Boggy Creek salt dome.

Seismic work was done in 1944, and the resulting seismic map gave additional control in the area. Two additional wells—both dry holes—were drilled immediately east of the Boggy Creek field by other companies and as Humble's subsurface geological maps became more complete, Humble decided to drill a well of its own on the east flank of the field to test formations below the Woodbine sand. It also was a "duster," but like the other dry holes in the area, the well log, cuttings, and other "in the hole" information indicated to the geologists they were getting warm.

After completing an eight-year leasing program, Humble did some additional seismic work, and in 1953 a well was spudded in to open up one of the biggest and most important discoveries of the year.

Many early-day oil fields were drilled from one-map reports. However, new oil finding techniques have been developed since the days of Spindletop, Luling, Mexia, Powell, Talco and Lytton Springs—all surface geological discoveries. If those same fields were to be drilled today, several maps probably would be made on the acreage before any drilling—or leasing—began. Recent discoveries point out this multiple mapping technique.

The King Mountain Field discovered by Humble in West Texas was primarily a seismograph discovery, but subsurface geological maps also were utilized. Trawick, a gas field in East Texas, was discovered as a result of surface, subsurface, and seismic mapping of the area. The older Anahuac Field was found with gravity, subsurface geological and seismic maps.

The more control Humble's geologists have on a prospect, the better they like it. A well is seldom if ever drilled any more unless the area is mapped at least two or three ways.

Mapping for oil has posed many complexities through the years, but the greatest specter on the exploration horizon is probably one that never will be solved completely. It is the human element of interpretation. Like X-ray pictures, the usefulness of oil maps depends on how well they are interpreted. Integrating, or putting the pieces of information together and presenting an interpretation by means of contour lines, is not always easy when only limited information is available to the geologist. It isn't like mapping a road or coast line where the features are plainly in view. Putting together a geological or geophysical map is like trying to visualize a picture puzzle 8,000 feet away with only four or five per cent of the pieces to work with.

How the contours of the subsurface formations extend between the control points sometimes requires good imagination or "guessing" by the geologist. True, it is an educated guess, but there

Staff geophysicist in Western Division Office checks seismograms with contours on seismic map. Other Humble geophysicists make gravity and magnetic maps from other types of information.

Draftsmen like these in the Midland Office also play a significant and vital role in the Company's map making program by helping keep the documents up to date and providing reproductions and presentation copies.

Humble's chief geologist, chief geophysicist, and staff members in Humble's Main Office in Houston carefully check points on battery of geological, geophysical maps before giving their final approval to spud in a new wildcat well.

is still that element of chance—the same factor that accounts for so many dry holes and makes the job of hunting for oil so costly.

And even when a map is perfect, when the geologist, geophysicist, and other members of the exploration team have done their job to perfection, there is still no assurance of finding oil. All a map can do is point out the most likely spot where possible oil-producing formations probably are located. The geologist has no assurance that oil or gas will be in the formation—even if the structure is plotted exactly and the drill bit hits in precisely the right place on the structure. In case after case in the oil industry, drill bits hit these objectives only to be rewarded with a dry hole.

Industry has drilled at least 20 dry holes on one of the most promising structures in East Texas, but to date has yet to find oil. The structure is there, is well defined and so the drilling goes on. Only each time, more information is added to the various subsurface geological maps of the area and the search narrows.

"It's hard to give up on a structure like that, one that looks so good," commented one geologist.

The old Hackberry Dome in southwestern Louisiana saw 40 or more dry holes drilled over a period of 25 years before the bit finally hit the oil sands. Various oil companies have been drilling for years on and around the Brookshire Dome near Katy, but as yet have not encountered any sizable accumulation of oil or gas. The structure, as pointed out by the maps, is there. There's only one hitch—no appreciable oil.

Since the first oil field map was prepared in America by a seventeenth-century French missionary showing a "fontaine de bitume" somewhere in New York or Northern Pennsylvania, maps have become progressively more accurate and reliable through the years. And the future looks even brighter. Each year finds new improvements in oil hunting techniques and in the oil hunting tools. And with this improvement in technology, geologists and geophysicists are learning to use the instruments more effectively, to interpret the data into more reliable information.

All of these innovations are making our oil field maps more accurate, more reliable. But while the maps are getting better, the oil fields are becoming harder to pinpoint. Wildcat drilling records last year testify to this statistical standoff. In the first nine months of 1956 in the U. S., 9,419 wildcat wells were drilled by the oil industry. Of that total 8,339 were dry holes. Most of the more evident structures have been drilled, and to find the smaller, more complex ones requires the combined efforts of many types of specialists—each with his own specialized technique.

It's pretty safe to say that the days of finding oil in the United States by stumbling on to an oil or gas seep in the ground are over. Also, the odds of discovering oil by accident today are too prohibitive even to consider.

The general principle of petroleum exploration remains the same today as it was in the early era of the industry: "Find the structure, then drill it." But now, more than ever before, oil maps are valuable guideposts to point the way.

New wildcat is end result of mapping activity. But the program doesn't end here. Whether it's a producer or a duster, the well will yield new subsurface data and the mapping will continue.

Ditching machines crawl ahead on dusty right-of-way, gouging out a trench for Humble's new pipe line. Blasting rock slows progress, but ditchers average about two miles a day. Pipe line will tunnel under 18 paved highways and railroads.

With 94 miles of steel pipe a small army of specialists lays for Humble Pipe Line Company a new line for

MORE CAPACITY

Pipe lengths are lined up along ditch, in preparation for welding operations.

Welders form continuous length of pipe by sealing together 40-foot sections.

THE flat, dusty, wide-open prairie land between Big Lake and Midland took on the busy atmosphere of Main Street at quitting time recently as a hustling task force of men and machines began work on Humble Pipe Line Company's biggest West Texas expansion project in recent years—a new, 94-mile pipe line from Ector to Kemper stations.

Giant bulldozers moved out first on December 17, clearing the right-of-way, knocking down the mesquite and straggly, drouth-hit brush. Then came the ditching machines, the pipe stringers, welders, inspectors, and dozens of other pipe line specialists. At the south end of the 35-mile parade clanked more bulldozers to cover the pipe and fill in the ditch.

When completed in late February or early March, the big 18-inch artery can move 100,000 barrels of crude oil a day from Ector Station north of Odessa to Kemper Station at Big Lake, 70 miles west of San Angelo. At Kemper it will feed Humble's 18-inch line to the Gulf Coast and Baytown Refinery as well as the Company's 10 and 12-inch system to Harbor Island.

The new pipe line, which replaces a 116-mile, multi-line system currently transporting crude oil from Ector to Kemper, is designed for two things: more pumping capacity, increased operating efficiency.

Capacity of crude from the Ector area will be boosted from 68,500 to 100,000 barrels a day—up 46 per cent as a result of the new line. This will enable Humble Pipe Line Company to handle maximum quantities of oil from the area without having to rely on facilities of other pipe line companies.

Pumping efficiency will be increased by the elimination of four booster stations in the older system. Previously, when the system was operating at maximum capacity, oil flowing from Ector Station had to be pumped five times during the 116-mile trip to Kemper. With the new line, along with a modernized Ector Station, the oil need be pumped only once.

Checking welds for defects is made easier with long-handled mirror. Each weld along the line will be inspected visually.

Portable X-ray machine makes positive inspection of about 15 per cent of welds. Any hidden defects are spotted on film.

Patching over welds with coal-tar enamel and felt prevents corrosion. Other portions of pipe were precoated in Houston.

An electrical holiday detector is employed by inspector to locate any defects in the coating applied around weld joints.

Pipe line is lowered into ditch with aid of a sidebeam tractor. This section of line has just crossed under a highway.

Backfilling the ditch, cleaning right-of-way is last stage of operation. Soon only the sign will mark line's location.

Weldon Williams, Humble Club special projects chairman, presents gift certificates to the three winners in the competition; third place, Mrs. Rosemary Habermacher; second place, Ivy E. Davis; first place, A. E. Kaeppel.

AN ART SECTION BY EMPLOYEES

Editors select for this issue six paintings from local employee show

FOR the past 12 years the HUMBLE WAY has commissined professional artists to paint for use in the magazine the moving story of the oil industry and the beauties of the area in which the Humble Companies operate. A few special assignments have been handled by artists from distant places, but most of the work has been done by Texan and Southwestern artists.

In this issue, for the first time, all of the paintings are by employee artists.

Last Fall a notice came to the attention of the editors of the HUMBLE WAY that a special showing of paintings by Houston Office employees was being held at a local art gallery. The editors went to see the show and came away impressed with the quality of much of the work.

The show had been put together and hung in the James Bute Company galleries under the auspices of the Humble Club Art Group, an association of some 60 Humble Houston Office employees and annuitants whose mutual interest in art served as the basis for the organization of the group two years ago. Members meet six times a year to hear art lectures or to view art films.

The Houston show included 26 pieces of work by eight members of the Art Group. From the show the editors selected two of the three prize-winning paintings and four others to develop the all-employee art section on the following four pages.

Two men and three women are represented in this section. All have had art training, either in local art schools or in some of the leading art schools in the U. S. Four of the painters represented are employees in the Exploration Department; one is a Production Department employee. All are full-time Company employees who follow their avocation during leisure hours. Small parties from the Humble Club Art Group often band together on holidays, week-ends, or vacations for sketching and painting trips.

The following employees were awarded gift certificate prizes by the judges: first prize, A. E. Kaeppel; second prize, Ivy Davis (President of the Art Group); and third prize, Mrs. Rosemary Habermacher.

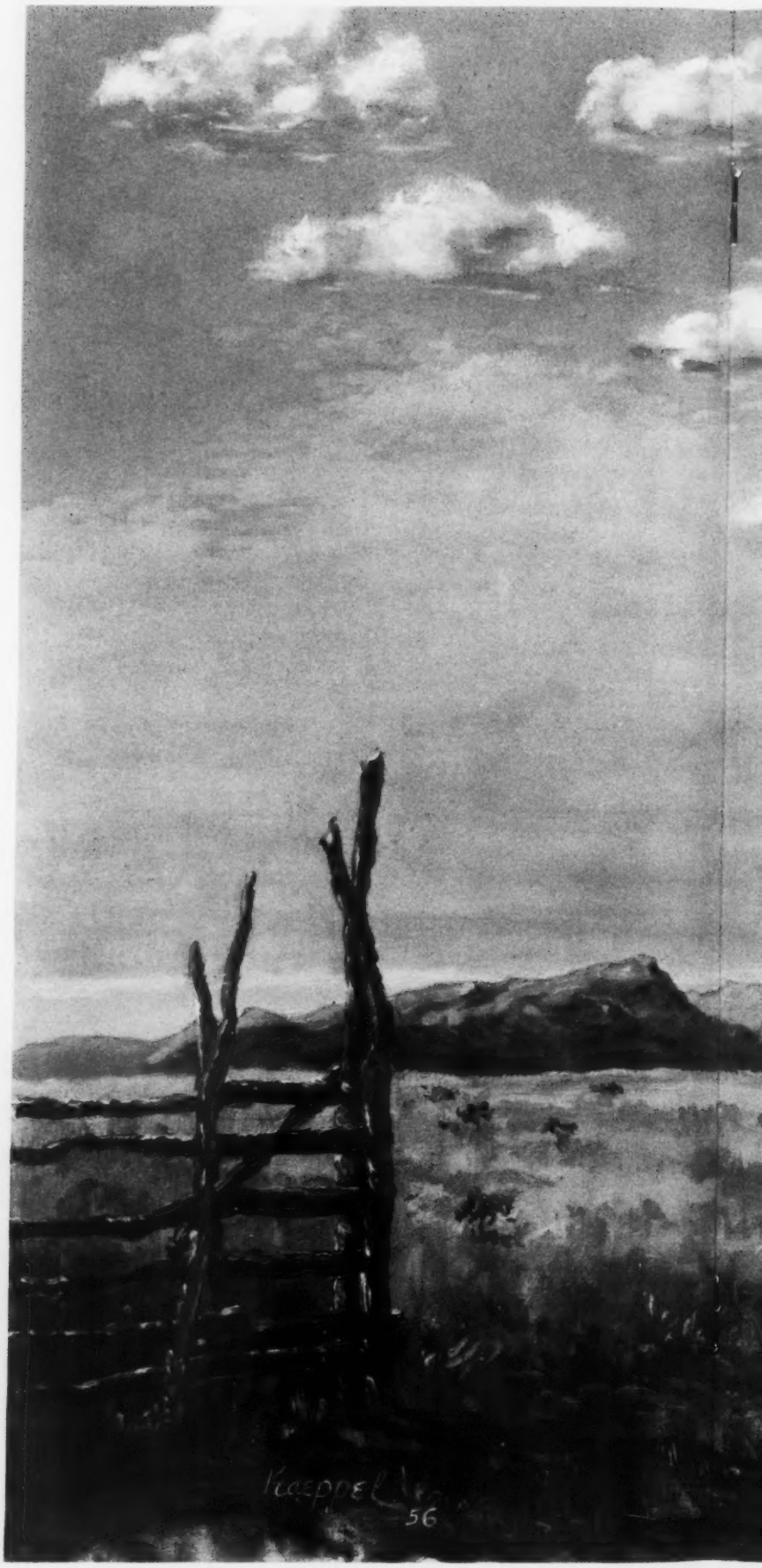
A. E. Kaeppel's *Saddle Mountain,* shown on the cover of this issue, was the prize-winning painting. His *Wide Range,* appearing on Pages 12 and 13, is another of nine oil paintings he had entered in the show.

Kaeppel, a 20-year employee in the Exploration Department, is assistant chief draftsman in the Scouting Division. He started work with Humble in 1936 as an artist and was employed to help with the preparation of the Company's Texas Centennial exhibit known as *Humble's Hall of Texas History.* Prior to coming with Humble he had studied art at the Art Institute of Chicago and the Art Students' League in New York.

First prize winner A. E. Kaeppel shows his Saddle Mountain, award winning oil painting which appears on the cover.

TRANQUILITY – oil painting by Genelle Fenton, Exploration Department.

ACCUMULATION – watercolor by Patsy Nell Rivers, Exploration Department.



WIDE RANGE — oil painting by A. E. Kaeppel, Exploration Department.

BRASS BOWL – third prize winning oil painting by Mrs. Rosemary Habermacher, Exploration Department

GOLD, BLACK AND YELLOW – oil painting by Ivy Davis, Production Department.

Streets of Acoma were once the stamping grounds for some 3000 Pueblo Indians—a number estimated by Onate. Thinly populated now the city still carries on.

CITY IN THE SKY

This lofty New Mexico town, which left the conquistadors awestruck, has much the same effect on visitors today

IN ALL America, from coast to coast and border to border, there is no other town like Acoma, New Mexico. It is in a class all by itself.

This historic Pueblo Indian village, which is little more than an hour's drive west of Albuquerque, has been variously described as the City in the Sky, the Quebec of the Southwest, and the Citadel on the Rock. With none of these glowing titles, once you have seen it, are you likely to find fault.

What is it that makes Acoma unique—and such an attraction for those who like to explore the byways of history?

For one thing, Acoma (pronounced *Ah-co-mah*) is toweringly situated on top of a 357-foot mesa. Its 70-acre pueblo site is an island in the clouds—one bounded by an almost unbroken line of jagged cliffs. Its streets and work areas drop off dizzily to a grass-stubbled plain. Ladder trails, once the only means of getting in or out, cling to its rocky sides.

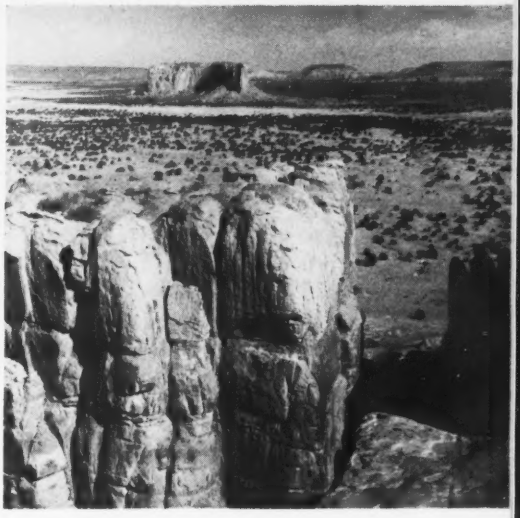
Yet this eagle's eyrie of a town, one of the world's most unlikely places for three-story apartment houses and a grandiose church, has been peopled for untold centuries by builders and farmers. It was the home of a flourishing civilization when Europe was still emerging from the Dark Ages. And this civilization still survives, in many respects unchanged. In fact, Acoma has a stout claim to being the oldest continuously occupied village in America.

One of Coronado's young captains, Hernando de Alvarado, was the first of the conquistadors to visit it. That was in 1540, and Acoma was even then a very old and time-mellowed city. To Alvarado and his men, this collection of terraced adobe buildings perched on a giant rust-colored rock was an amazing sight. Alvarado estimated that a shot from a harquebus would be hard put to reach the top of the mesa. One of his men called Acoma "the greatest stronghold ever seen."

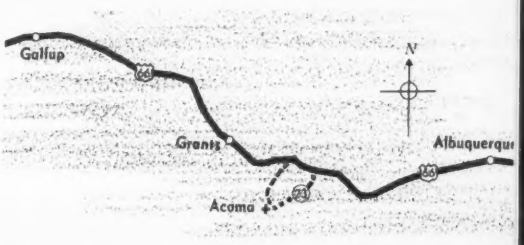
Acoma's first resident missionary was Fray Juan Ramirez. He arrived in 1629, and it was he who built the magnificent mission (San Esteban Rey) which still stands atop the mesa. All materials used in building this church—from adobe mud to heavy timbers—had to be brought up from the valley. The roof beams were carried on human backs from mountains 30 miles away.

Today, only a few Acoma families live on the mesa. Most of the Acoma people live a few miles away on the plain, at spots closer to their farmlands. On ceremonial occasions, however, this ancient tribe of Pueblo Indians returns to its ancestral home.

Editor's Note: This is a brief account of a scenic side-trip available to motorists traveling Highway 66 between Albuquerque and Gallup. Acoma is about 27 miles southeast of Grants, where one of Humble's newest service stations in New Mexico opened Jan. 5.



Across crags of Acoma looms gaunt form of Enchanted Mesa (430 ft. high), which legends say was ancient home of tribe.



Mission is one of oldest in state. Its walls are 10 feet thick. Dirt for burial ground was brought up from plain below.

On a lonely mesa in Navajo country, a sheepherder takes time out to watch a drilling rig at work.

Humble is helping to inject new life into the age-old land of the Navajo and Apache as the search for oil and gas moves

Northwest to Farmi

ON a windswept, pinon-dotted mesa in northwestern New Mexico, a visitor to Humble's Jicarilla No. K-1 picked his way across rock-strewn ground to a lookout point near the rim. He peered down at another Humble well not far below on the canyon floor.

"That well couldn't be much more than a mile from here," he told the tool pusher who had brought him out from Farmington. "Could we drop by and take a look at it before heading back to town?"

The tool pusher eyed the craggy no man's land that separated them from the other well. "We sure could," he grinned, "but we'll have to drive 51 miles to get there."

Such are the rugged realities of time, distance, and terrain Humble men are encountering these days in the tangled vastness of New Mexico's San Juan Basin.

In this amazing oil patch, a three-hour jeep ride that nets you only a mile as the crow flies—or as the Alpinist climbs—lifts very few eyebrows. To the men in Humble's Farmington office, home base for our operations in northwestern New Mexico and the colorful Four Corners area, a safari of this kind is merely part of a day's work—another of the problems that go with drilling for oil and gas.

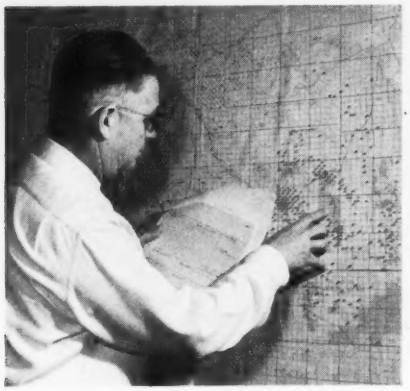
Let's take a look at some of these problems. They range from weather to water, and from transportation to Indian relations. Winter temperatures, for example, can plummet overnight to 30 degrees below zero. It sometimes costs more to truck out a load of oil —a distance at most of only a hundred miles or so—than it normally does to ship the same amount of oil halfway across the Atlantic Ocean. And supplying a rig with water, ordinarily a minor expense, may add several thousand dollars to the cost of drilling a well.

As a newcomer once remarked to a New Mexico geologist: "It's a nice country, but a horned toad going across there had better carry a bedroll and a water bottle."

For men working in rugged areas of Farmington district, a survival kit in trunk of car is a routine precaution.

Counties with oil and gas production are bunched in two corners of state.

This pin-studded map shows pace of activity in San Juan Basin.



nington

Until comparatively recent times, there were very few people who had need of this advice. For centuries most of this abrupt, mountainous area lay in the iron-fisted grip of the Navajo and Apache. Not until the 1870's—after a trail had been blazed by Spanish padres, trappers and fur traders, frontiersmen such as Kit Carson, and the U. S. Cavalry—did homesteaders and stockmen start settling there in numbers. And it was even later before peace finally won a clear-cut victory over six-gun and tomahawk.

Today, however, the land where troopers once rode ready for battle is fast coming into its own. Still rough-hewn, and as hard as ever on tender

THE LAND OF RIGHT NOW

A noted writer on the Southwest, Charles F. Lummis, once described New Mexico as a national Rip Van Winkle. He saw it as a giant drowsing in the sun—one willing to wait until *manana* before getting on with the task of building a future. He went on to dub this sleeping giant "the land of *poco tiempo*," the land of pretty soon.

That, however, was the New Mexico of more than half a century ago. Today, the land of pretty soon that Lummis wrote about could be more aptly described as the land of right now.

New Mexico still has, of course, its great unfenced stretches of sun, silence, and adobe. It still wears the patina of a proud history. But the Rip Van Winkle of yesterday—in size our fourth largest state—has long since shaken off the fetters of sleep. Bright-eyed and briskly enterprising, it is not only staking out new trails of progress but also improving the old.

For example, New Mexico is currently adding citizens at a rate almost twice the national average. Since 1950, says the Census Bureau, it has had a population gain of 19.6 per cent as compared to 10.9 per cent for the country as a whole. In many of its towns, some enthusiasts claim, the city limits are here today and out yonder tomorrow.

This strapping young state is also beginning to flex some economic muscles whose tendons range from consumer goods to atomic weapons. But among the most important of these sinews are oil and gas.

For years, New Mexico's oil operations have been largely concentrated in the four counties that make up its southeastern corner—the Hobbs area. Today, though, diagonally across the state, there are equally big things astir in the long-dormant San Juan Basin. This northwestern sector flanks one of America's newest hunting grounds for oil—the Four Corners area where Utah, Arizona, Colorado, and New Mexico all meet.

A center for much of the fast-developing Four Corners activity is Farmington, the headquarters for Humble's production district in the Four Corners area and also, since December *(see Page 21)*, the home of our most distant marketing outpost.

Humble's operations in this sprawling district, where drilling rigs now loom over the stark but colorful lands of Navajo and Apache, form the basis for the accompanying story.

On Navajo reservaton an Indian family pulls up at Humble's Beautiful Mountain wildcat to pass the time of day with Toolpusher Earl D. Wolcott.

feet, it is beginning to make the most of resources both old and new. Orchards and fields flourish in the river valleys, sheep graze quietly in the shadow of the mesas, and the only skirmish line is one of derricks marching across the horizon.

The focal point for much of this activity is Farmington, largest town in the San Juan Basin and one of the fastest growing in the entire nation. In 1950, this little town at the juncture of the San Juan, La Plata, and Animas rivers (a spot known to the Navajos as Totah, or "Place Among Waters") had a population of less than 3700. Its present population—after five seams-bursting years—is more than 15,000, which is a dramatic testimonial to the economy-building powers of oil and gas discoveries.

It was to Farmington two years ago that a small group of Humble production men came to set up a district office. Their arrival followed more

FARMINGTON THEN AND NOW

IN A WAY, Farmington's current role as an oil center is nothing more than history playing a return engagement. Back in 1907, when the town was little more than an overgrown trading post with board sidewalks and dusty, hoof-marked streets, Farmington was the scene of one of New Mexico's first oil plays.

For years, old-timers had known the land thereabouts possessed some exceedingly curious properties. Throw a lighted match to the ground in certain spots, and the surface would give off an awe-inspiring flash. To a small group of Farmington men, this spelled oil.

Pooling their resources, these men bought a tract south of town where this flashing was most persistent. They imported a couple of drillers, moved in a coal-fired cable tool rig from Colorado, and spudded in a well. But the project had to be written off as a failure. The well produced only gas, at that time thought to be worthless, so it was junked and abandoned.

Many hopes were shattered, but Farmington can now afford to look back on that first abortive effort and smile. For year by year, well by well, the evidence has piled up that hidden in the rocky depths of the San Juan Basin are tremendous quantities of gas. Furthermore, that gas is now much in demand.

As 1957 started, some 2300 gas wells had been completed in the Basin. Known reserves were estimated at more than 17 trillion cubic feet of recoverable gas. And that long-time hitch—the lack of pipelines to carry the Basin's output to market—has been largely removed.

To the coming of the pipelines, incidentally, must be credited much of Farmington's surging growth. Unless it can be moved to market, gas is of no more use today than it was back in 1917. Thus, it was a red-letter event when, in the Fall of 1951, the last string of 24-inch pipe was put in place on a gas line connecting the San Juan Basin with the California border. Since then, a second gas line has been laid to the Pacific Northwest.

Adequate pipeline facilities for moving oil are still lacking, but the recent flurry of oil strikes in the Four Corners area promises a speedy solution to that problem. Already one oil pipeline from the Four Corners to southeastern New Mexico has been announced, and two others are reported to be in the planning stage.

On Jicarilla reservation, much of the terrain is a picturesque wilderness. Rig shown here is only one air-mile from nearby Humble well—but 51 miles by car.

than a decade of exploratory work in the area, a search climaxed in October of 1954 by a successful wildcat on a Jicarilla Apache lease. Setting up shop in a low-slung, ranch-style building, these men lost little time in tackling the problems of drilling for oil in a land of mountains, canyons, and rocky plains.

To the normal difficulties of working in rugged terrain, they found added here the additional problem of big distance. For example, ask the people in Humble's Farmington office just how big their bailiwick is, and they'll smilingly tell you that it's roughly a hundred miles long, 150 miles wide, and two miles high. But that is just the most active part.

Actually, the map shows, their district takes in considerably more territory than that. It covers some 31,000 square miles in New Mexico's upper left-hand corner and spills over into another 62,000 square miles of neighboring Arizona. Included in this sprawling expanse are two large Indian reservations—the 15 million acres of the Navajos and the 750,000 acres of the Jicarilla Apaches. One Humble well is 120 miles from the district office.

As far as elevation is concerned, the Farmington district falls a little shy of the two miles claimed in jest, but not by very much. One Humble well (Jicarilla No. L-5) perches atop a 7460-foot mesa, and a Humble radio tower, located on a mountain, reaches more than 9000 feet into the sky. Even the district office in Farmington, which is in a valley, stands on ground that is exactly a mile high.

"If this country were spread out real thin," one observer has commented with some justification, "it would be bigger than West Texas."

If such were the case, it would also go a long way toward solving another of the area's problems—that of the lack of adequate roads. So wild and precipitous are a few sections that even the Indians once despaired of using them as grazing lands. From their viewpoint, therefore, not the least of petroleum's boons has been the roads the oil companies have brought with them.

In some of the more remote spots, many of these roads are still on the primitive side. The 51-mile route between the two mile-apart Jicarilla wells carries the unofficial name of Humble's Skyline Drive, but it is hardly recommended for a pleasure trip. Road conditions are also responsible for the high cost of trucking oil from well to market. Producers have had to pay as much as 70 cents a barrel to get oil hauled only a hundred miles.

During the winter months, snow and ice make some of the roads completely impassable. For that reason, winter brings a sharp fall-off in drilling activity, especially in that part of the Farmington district crossed by the Continental Divide. Oddly enough, it is not ice that impedes production operations so much as it is the inevitable thaws, which can make the ground around a rig slick as grease.

There is also the threat of a howling blizzard sweeping down from the Rockies and trapping someone in the mountains since temperatures of 30 degrees below zero are not at all uncommon in the Jicarilla area. Humble's men take several precautions against such a mishap. They not only keep an eye cocked on the weather reports, but they also carry in the trunk of their cars two spare tires, a five-gallon can of gasoline, and a large survival kit. Packed into the latter are such items as a three-day supply of food, a hunting knife, a small stove that uses canned heat, an emergency signal device, and a sleeping bag.

Another major problem involves water. In the Jicarilla area, Humble gets its water for drilling from dry washes—the sandy bottom lands upon which snow has melted and seeped underground. Bulldozers gouge out large 10-foot-deep sumps. Water seeps into these pits, whereupon it is pumped out and hauled to the rig in 100-barrel tank trucks. Humble has had to haul water as far as 20 miles. One company reported recently that its water costs on a Farmington area well amounted to $10,000.

The Four Corners area poses a dif-

In front of Farmington office, Superintendent R. M. Lilly points out a location on map to his chief clerk, J. M. Wisely.

ferent kind of water problem. Here it is too much water, not too little, that brings on the headaches. Artesian water flows are the source of the trouble.

On the brighter side are Humble's relations with the Indians. Most of the Company's leases in the Farmington district are on either Navajo or Apache land, but the only problem that presents (if it can be called a problem) is the occasional one of a language barrier. Even that one is fast disappearing. A sight in keeping with the times is a Navajo boy astride his burro, reading a comic book while the family sheep graze.

Humble's surface geologists and gravity meter crews have worked in the Indian country for the last 15 years, and many of them have put in long stints on the reservations. A year or so ago, one young geologist, newly married, set up housekeeping with his bride in a trailer over on the Arizona side of the Navajo reservation. For several weeks, their main contact with the outside world was the weekend trip to Shiprock or Farmington for groceries and supplies. By the time they moved on to another assignment, they were becoming right adept at speaking the Navajo language.

The Indians on the reservations, Humble people have found, are great hitchhikers. One day, while on his way to Humble's Arizona well, Geologist C. A. Janes saw a large Navajo woman standing along the hot, dusty road. He pulled up to give her a ride. Standing behind her, he soon learned, were two goats, a sheep, and a baby boy. All of them piled into the car and rode for 30 miles—an Arizona replay of an episode from "The Teahouse of the August Moon."

Humble's production men have also found that the Indians hew to a quid-pro-quo line. District Superintendent Russell Lilly once stopped to help a Navajo family whose old-model sedan had run out of gas. Lilly siphoned some gas into the Indians' tank and then turned down the money they tried to thrust upon him. The Navajos, though, insisted upon giving "something for something." In the back seat of the car, a woman member of the family took off a beautiful turquoise necklace and tried to get Lilly to take it. Again he politely refused the offer. In desperation, the Indians brought out a watermelon. This Lilly finally accepted.

In the coming months, the Navajos and Apaches will probably be seeing even more of Superintendent Lilly and his men. Current plans call for drilling between 30 and 40 wells in the Farmington district during 1957. And since this kind of activity is just as pleasing to the Indians as it is to Humble, the present friendly relations are expected to continue.

Humble people are only kidding these days—and trying to preserve a little of the flavor of the Old West—when they say: "Let's head out to the reservation. You drive and I'll ride shotgun."

At Sanostee trading post, near Humble's Beautiful Mountain wildcat, Navajos hold outdoor meeting on tribal affairs.

New bulk station includes this gleaming office and warehouse building. It will serve dealers and other accounts throughout the San Juan basin.

First Humble station to be built in the area is located on main street of Farmington. It opened last September.

EXTENDING THE FRONTIERS

Humble expands New Mexico marketing program by opening a new bulk station in Farmington

ON A WINTRY day in mid-December, Humble took another long forward step—one measuring about 190 miles, or the distance from Albuquerque to Farmington—in its New Mexico marketing program.

It took this step when, on December 15, it opened the doors of its Farmington bulk station, a spanking-new installation which replaces the one in Albuquerque as Humble's most remote distribution outpost.

The new bulk station will greatly increase the availability of Humble products and service in the San Juan Basin and the Four Corners area. It will distribute gasoline, diesel oil, and other products to three Humble service stations planned for Farmington (the first of which was put into operation last September) and to other nearby communities as demand grows.

Three days before the bulk station opening, Humble officials met with a group of Farmington's leading businessmen at a "get-acquainted" luncheon. Among the speakers were John W. House of Midland, production superintendent of the Western Division; Choyce Allison of Houston, manager of retail sales; and W. C. Barnes of Albuquerque, head of Humble's sales program in New Mexico.

They pledged that Humble will bring to northwestern New Mexico not only top-quality products but the best in service and facilities.

At luncheon meeting in Farmington, W. C. Barnes of Albuquerque tells of Humble's marketing plans for area.

Color prints of Humble Way paintings are given to those in attendance.

Vantage point on top of tanks gives bird's-eye view of site to Bulk Agent Oliver C. Nash (left) and visitors Choyce Allison and W. C. Barnes.

Main speaker at meeting was John W. House of Midland, shown here arriving at airport and being greeted by Choyce Allison (at left) and R. M. Lilly (at right).

Crude Oil Prices Increased 35 Cents a Barrel

As of 7:00 a.m. on Thursday, January 3, Humble Oil & Refining Company increased its posted prices for crude oil in Texas an average of about 35 cents a barrel, generally with a range for various grades above and below that average of 5 cents and 10 cents according to their relative values.

In announcing the increase, Hines H. Baker, President of Humble, said:

"The immediate cause of this price change is the sharp increase in demand for domestic crude oil, particularly in Texas, that has developed since the flow of Middle East crude oil to Europe and the East Coast was drastically curtailed by recent events. Humble has been unable to secure its requirements at former prices.

"An important cause of a more basic nature is the substantial rise in unit costs since the previous general increase in crude oil prices in June, 1953. During this period of more than three and a half years crude oil prices generally have remained constant although wages and salaries, costs of materials purchased, and the investment required for the same amount of production have all increased greatly. In view of these various circumstances, Humble has advanced prices by an amount that should help it to secure additional supplies which it has been unable to purchase to meet unusually heavy demands, and should also tend to encourage the rate of domestic exploration and development of new oil resources desirable for reasons of national security."

Office Buildings Department Employees Set Safety Record

Employees of the Office Buildings Department in the Houston Main Office and Houston Research Center recently celebrated the completion of one million hours of work without a disabling injury.

The American Petroleum Institute and Humble Oil & Refining Company plaques recognizing the 1,000,000-hour achievement were presented to the group by Ray H. Horton, Humble Director. J. M. Craddock, Department Manager, accepted the plaques on behalf of all employees.

Ray H. Horton and J. M. Craddock

The 243 individuals making up this group are responsible for the smooth functioning of equipment and facilities in the Humble Building in Houston and the Houston Research Center. There are five separate divisions in the Department —General Maintenance Division, Technical Maintenance Division, Research Center Division, Telephone Division, and Building Manager's Office.

Ethylene Recovery Plant Scheduled for Refinery

Construction of a large ethylene recovery plant will begin soon at Baytown Refinery.

The unit, part of Humble's program of expansion in the petrochemicals field, is scheduled for completion about the middle of 1958. It will recover more than 80 million pounds of high purity ethylene a year from refinery gases. Its capacity can be more than doubled by later equipment additions.

Construction of the unit will be in conjunction with a third fluid catalytic cracking unit and associated light ends units which also will be built at the Refinery.

The ethylene produced by the plant will be sold in the Gulf Coast area and will be transported by pipeline. Ethylene is one of the most versatile of petrochemicals. It is used in the manufacture of synthetic rubber, plastics, anti-freeze, tetraethyl lead, and liquid detergents.

Dr. Sherman S. Shaffer

Dr. Shaffer Elected to Chemical Society Post

Dr. Sherman S. Shaffer, staff associate in the technical and research divisions at Baytown Refinery, has been elected chairman of the American Chemical Society's division of petroleum chemistry for 1957.

The petroleum chemistry division is the largest of several in the ACS, and has a membership of approximately 3,000 members, most of whom are in the United States. Its primary concern is the organization and presentation of technical programs reporting results of research in petroleum chemistry—both from industrial and university laboratories.

J. H. Craddock

Craddock New Aviation Committee Vice Chairman

J. H. Craddock, sales engineer (aviation) of Humble Oil & Refining Company, has been elected 1957 vice chairman of the Aviation Advisory Committee of the American Petroleum Industries Committee.

The Aviation Advisory Committee's function is to conduct studies relative to excise taxes on aviation petroleum products and to foster the operation of airport petroleum facilities under private enterprise.

Mr. Craddock, a former Braniff Airways pilot and later chief pilot for the Collins Radio Company, is a graduate of Rice Institute and Southern Methodist University Law School. He has been connected with Humble's Aviation Sales Division since 1948.

API Honors Five Employees

Five Humble employees were honored recently by the American Petroleum Institute for outstanding service to the petroleum industry during 1956.

J. N. Beasley, Jr., assistant employee relations manager, received a Gold Award. He was honored for developing and guiding an employee information program which has been adopted nationwide.

J. N. Beasley, Jr. (left) receives API award from Gulf Southwest OIC District Chairman Joe T. Dickerson.

Receiving Silver Awards for work in other fields were Dan Mendell, North Texas Division Civil Engineer and C. G. Swank, Conroe District Superintendent, Production; and L. F. Roman, Local Manager of the Galveston Bulk Station.

Janet Curtin, secretary in Advertising-Public Relations Department, Houston, was awarded a bracelet for 25 presentations of the "Magic Suitcase," a petrochemical demonstration.

Lee, Byrd Help Direct OIC Program

The oil and gas industry has selected two Humble employees to help direct its 1957 public information and service program in the West Texas and the Lower Gulf Coast areas, with a total of 33 counties.

S. Howard Lee, Corpus Christi distirct sales manager, was appointed Lower Gulf Coast Area Chairman of the Texas Oil Information Committee and will direct the industry's public information and service program this year in nine counties surrounding Corpus Christi.

Lawrence H. Byrd, assistant division superintendent at Midland, was appointed West Texas Area Chairman and will direct the same program in 24 West Texas counties.

West Texas and the Lower Gulf Coast are two of sixteen OIC areas in Texas in which more than 2,000 volunteer oil men and women help keep the public abreast of the petroleum industry's plans, progress, and contributions to modern living.

OIC, sponsored by the American Petroleum Institute, provides free teaching materials to junior and senior high schools and programs on oil to clubs and organizations. It also promotes Oil Progress Week in October.

Recent Retirements

HUMBLE PIPE LINE COMPANY

Name	Location	Date of Retirement	Years of Service
Jordan H. Carr	Satsuma Station	January 25	32
William F. Caraway	Baytown	January 22	34
Que Duane Edwards	Harbor Island	February 3	30
Newburn E. Hays	Refugio Station	December 29	18
Robert L. Mathis	Pierce Junction	February 7	26
William Z. Reagan	Hearne Station	January 21	32

PRODUCTION DEPARTMENT

John R. Carroll	Tomball Natural Gas System	February 6	32
Frank B. Cox	Marine Division at Galveston	January 4	36
Brittian D. Bell	Anahuac	January 31	36
Ottie P. Holman	Means	December 27	31
Milton E. Mitchell, Sr.	Houston Garage	January 25	33
Estes C. Morgan	Gladewater	January 23	24
John W. Turner	Hardin	November 15	32
Richard L. Westbrook, Sr.	Stratton	January 17	27
Lawrence J. Willis	Laurel Mississippi	February 7	29

BAYTOWN REFINERY

Elmer T. Dahlquist	Garage	February 4	27
Emil H. Harbers	Distillation Dept.	January 8	37
Walter E. Hogue	Reclamation Dept.	February 1	30
Clarence W. Jackson	Pumper & Gauger Dept.	December 22	31
Benjamin L. Tilton	Utilities Dept.	January 28	32

HOUSTON OFFICE

Otis C. Crabbe, Sr.	Sales Accounting	February 12	26
Walter E. Hill	Advertising and Public Relations	January 13	37
Harry B. Maggard	PL-Treasury	January 10	37

Deaths

Employees: James R. Brannan, Jr., 58, assistant statistical section head in Refining Dept. in the Houston Office, on January 2; Hiram L. Busby, 62, lease pumper-gauger at London, on November 21; Edward F. Harman, Jr., 30, warehouse supervisor at Vernon Bulk Station, on January 1; Thomas "G." Harris, 58, field gauger at Alice District, on December 11; Frank L. Jolly, 55, assistant buyer in Houston Office, on December 28; Edward E. McNulty, 52, operator at Baytown Refinery, on November 16; Posie L. Robberson, 48, operator at Baytown Refinery, on December 20; Arthur D. Schwander, 55, division operations sales manager at San Antonio, on November 17; Robert L. Sloan, 59, district superintendent at Hawkins, on November 26; Paul White, 53, operator at Baytown Refinery, on January 7.

Annuitants: Joseph G. Blake, 66, former engineer at Eckert Station, on December 30; Amos G. Boughton, 64, former helper at Baytown Refinery, on December 23; Lemuel C. Bumpass, 68, former lease pumper-gauger at London, on December 29; May D. Fransen, 67, former stillman at Baytown Refinery, on November 21; L. D. Harris, 75, former pipe machine operator at Baytown Refinery, on December 29; Otis M. Hilton, 64, former operator at Baytown Refinery, on December 5.

Gus Kellogg, 71, former superintendent of Claim & Right-of-Way in the Houston Office, on December 3; Arthur B. Martin, 68, former mixer man at Baytown Refinery, on January 1; John W. McCullough, 71, former engineer at Harbor Island, on November 30; Babe Roy, 60, former gang pusher at Lovell Lake, on December 27; Peter Skopal, 77, former janitor at Baytown Refinery, on November 29; Lawrence W. Taylor, 65, former field supervisor at Baytown Refinery, on December 24; Oilin W. Williams, Sr., 60, former lease pumper-gauger at Hardin, on December 28.

Behind this issue

● Sometimes the story behind a picture is about as interesting as the picture itself. Take, for example, staff photographer Tom Nowlin's eye-catching shot of the Indian and the wildcat well on page 16. To get this picture, Nowlin—accompanied by staff writer Jay Rose—had first to make the long jaunt from Houston to northwestern New Mexico. At Farmington they were joined by John Robinson, assistant district chief clerk, who guided them over the bouncy roads to the remote location of the Beautiful Mountain wildcat test.

In search of an unusual camera angle, Nowlin decided to climb up to the top of a high mesa which overlooked the drilling site. Willingly, if less enthusiastically, writer Rose and Robinson joined him in the scrambling climb up the face of the rock.

Atop the mesa, the trio made a discovery as startling as Robinson Crusoe's footprint in the sand. They saw, instead of a footprint, the tire prints of a Jeep. Walking on, they came to an empty Indian hogan, and finally to a flock of sheep in care of a lone Navajo mounted on a pony. There was, the Indian explained, a rude but usable road up another flank of the mesa, out of view of the drilling site. That explained the Jeep tracks.

The Indian consented to have his picture taken; photographer Nowlin found the camera angle he was seeking, and with a flick of the shutter release the picture was made. In a hundredth of a second.

Writer Rose on the path to Acoma.

On their trip to the Farmington area, Jay Rose and Tom Nowlin also stopped off at New Mexico's famous Acoma pueblo to get the pictures and information for the story that appears on page 15. By this time, mesa-climbing was a routine activity for the writer and the photographer, and they had no qualms about scrambling up the ancient trail to the Indian village on top (see cut). They were glad to note, however, that there is also an easier path up the mesa, used by most of the thousands of visitors who come to see the pueblo each year.

● When staff writer Joe Tucker and photographer Mel Coston went to West Texas a few weeks ago to get information and pictures for the pipe line construction story on pages 8-9, they were made uncomfortably aware of the long drouth that has plagued that area. The arid plain where the pipe line work was in progress was covered with a thick layer of powdery dust. Every footstep and every turn of a wheel would raise a choking cloud of dust, which didn't seem to bother any of the pipeliners. Finally, Tucker commented on the dust problem to one of the men, a West Texan. "Man, you haven't seen any dust," the pipeliner replied. "You should have been out here last week before we had that quarter-inch rain."

● Art, it seems, is contagious. The casual observer, watching an artist at work, soon finds his own hands itching to seize a brush, to put his own impressions down on canvas. A good example of this infectious phenomenon was apparent in the recent exhibit of the Humble Club Art Group (see page 10). Three of the young ladies whose work was shown are employees in the Scouting Section of the Exploration Department, where veteran artist Al Kaeppel is assistant chief draftsman. All three have become interested in painting as a result of Kaeppel's enthusiasm, talent, and willingness to share his knowledge.

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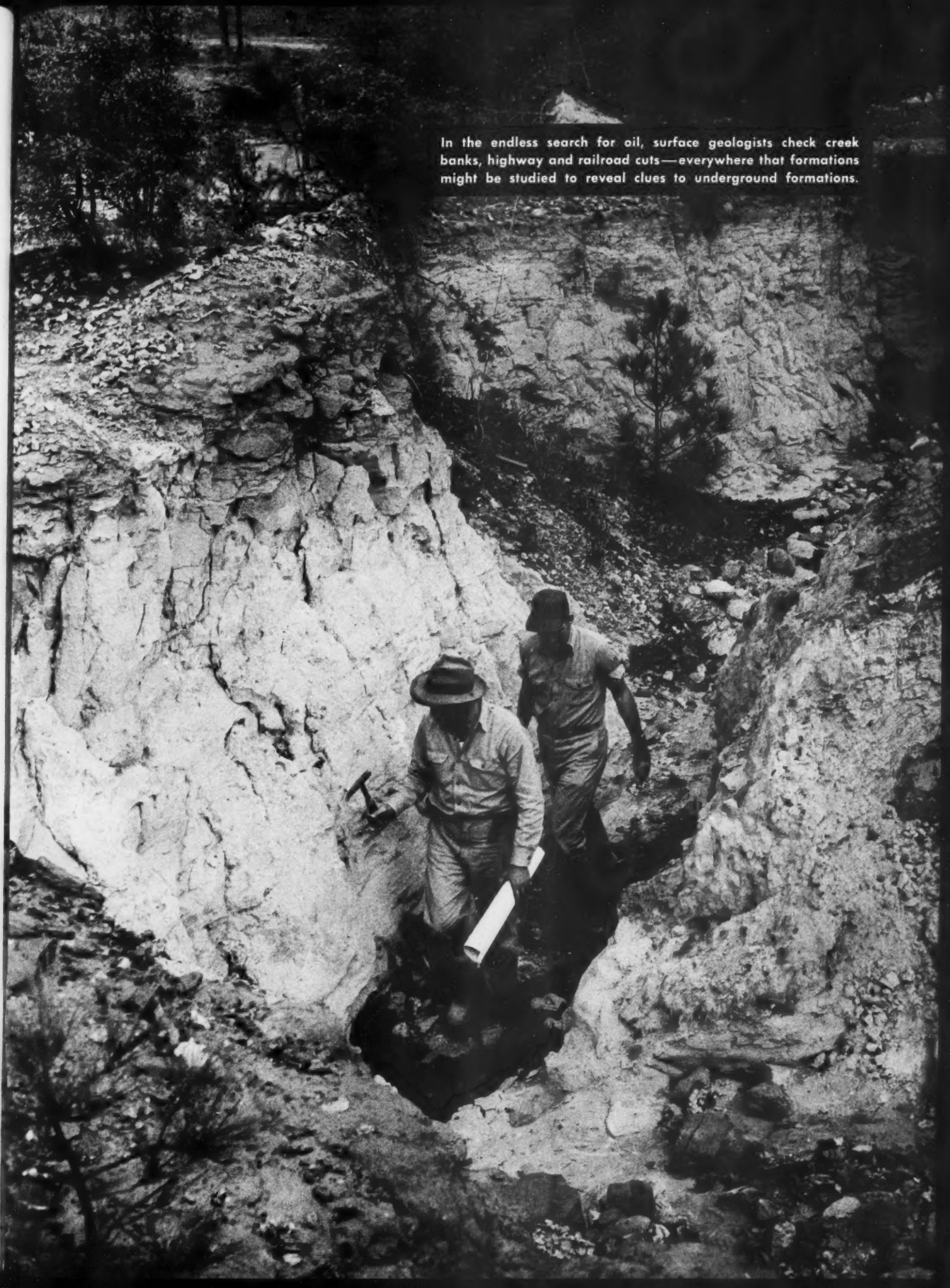

In the endless search for oil, surface geologists check creek banks, highway and railroad cuts—everywhere that formations might be studied to reveal clues to underground formations.